a layer of insulating material, on top of said substrate, said layer of insulating material having a first edge;

said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and

a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs; which method comprises the steps of:

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(a) contacting said sensor with a sample suspected of containing an analyte; and

(b) scanning the voltage from a negative voltage to a positive voltage such that the scanned voltage is of a range where said analyte should be oxidized or reduced at said microband electrode.

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36. (Once amended) A method of utilizing a microband electrode array sensor comprising a substrate having a first edge;

a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;

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said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers and;

a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs ;said method comprising the steps of:

(a) contacting said sensor with a sample suspected of containing an analyte; and

(b) performing anodic stripping voltammetry.

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38. (Once amended) A method of detecting the presence and measuring the concentration of analytes in a sample, the method comprising the steps of:

(a) contacting a microband electrode array sensor comprising:
a substrate having a first edge;
a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;
said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;
a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and
a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs;
with a sample suspected of containing an analyte;

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(b) applying an electrical potential to the sensor, and;

(c) measuring the electrical current flowing through the sensor.

42. (Once amended) The method of claim 38 wherein the analyte is detected by:

(a) applying a positive voltage for a sufficient time to allow for an analyte to be oxidized onto the microband electrode; and

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(b) scanning the voltage in a negative direction to reduce the plated analyte off the microband electrode.

43. (Once amended) The method of claim 38 wherein the analyte is detected by:

(a) applying a negative voltage for a sufficient time to allow for an analyte to be reduced onto the microband electrode; and

(b) scanning the voltage in a negative direction to oxidize the plated analyte off the microband electrode.

45. (Once amended) The method of claim 44 wherein in the multi-layer microband electrode sensor each of said substrates is planar.

46. (Once amended) A method for performing electrochemical measurements on a sample comprising the step of contacting a sample suspected of containing an analyte with a microband electrode array sensor comprising:
a substrate having a first edge;
a layer of insulating material on top of said substrate, said layer of insulating material having a first edge;
said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;
a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge; and
a plurality of gaps, one gap between each of two adjacent microband electrodes and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs; and
wherein the sensor is integrated into a channel.

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49. (New) The method of claim 34 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

50. (New) The method of claim 34 wherein the exposed surface of each of said microband electrodes has a thickness of between about .03 and 5 micrometers.

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51. (New) The method of claim 34 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.

52. (New) The method of claim 34 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

53. (New) The method of claim 52 wherein said adhesion layer comprises chromium.

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54. (New) The method of claim 36 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

55. (New) The method of claim 36 wherein the exposed surface of each of said microband electrodes has a thickness of between about .03 and 5 micrometers.

56. (New) The method of claim 36 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.

57. (New) The method of claim 36 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

58. (New) The method of claim 57 wherein said adhesion layer comprises chromium.

59. (New) The method of claim 38 wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

60. (New) The method of claim 38 wherein the exposed surface of each of said microband electrodes has a thickness of ~~between~~ about .03 and 5 micrometers.

61. (New) The method of claim 38 wherein the exposed surface of each of said microband electrodes has a thickness of between about .1 to about .2 micrometers.

62. (New) The method of claim 38 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

63. (New) The method of claim 62 wherein said adhesion layer comprises chromium.